George's PINK PAGES

Winter Behavioral Activities

Unfortunately, most beeHAVERS as well as some beekeepers misunderstand the life of a bee in the winter or think anthropomorphically. Except in our Southern warmer states, brood rearing ceases for about 30-45 days sometime between the end of November and Mid January in Central Maryland. When outside temperatures become about 55-60 degrees, bees start to form a cluster around the brood nest and this cluster becomes tighter and hence smaller in size as the temperature goes down. Bees do NOT heat the space inside a hive body or the area surrounding the cluster! Temperature inside a broodless cluster remain between 68 and 86 degrees even when the temperature go as low as -25 (25 below zero). In late fall, the cluster is first formed in the front lower part of the hive and the upper part of the cluster is in contact with stored honey. AS honey is consumed as the winter progresses, the cluster moves upward and towards the rear of the hive, distancing itself from the front entrance. Honey is converted into heat by the metabolic processes of the bees inside the cluster and this heat is conserved by the insulating qualities of the CLUSTER as well as the enclosed comb!

Obviously, those bees most interior within the cluster rotate with the outermost bees so that all the clustered bees get some honey to eat and distribute the heat they produce to the others. Because the bees are dependent on the warmth of the cluster to remain mobile, they dare not leave the safety of the cluster for even an inch to secure more honey. Therefore, bees have difficulty moving HORIZONALLY (sideways) to encompass a side frame. This creates a "chimney" effect of honey use in the colony; i.e., consuming honey VERTICALLY rather than horizontally. Bees do defecate in the hive, so when the temperature raises to about 45 degrees or above and if the sun is shining, the bees will take a very short "cleansing flight", but return quickly before they become chilled and can't fly. Bees can begin foraging for pollen, nectar, or water whenever the temperature becomes 50-55 degrees. When brood rearing is in progress, in spite of the outside temperature, the brood must be kept at 91-96 degrees; and feeding this new brood rapidly depletes the store of honey in the colony. This is the reason that more colonies die of starvation in March in the Maryland area than any other month of the year.

Behavioral Activities of Queens

Let's start right at the beginning of the queen's life: Newly emerged queens are very active to be sure that they are the only queen in the colony. Unless prevented by the worker bees the first emerged virgin queen travels through the colony and eats through the side wall of every queen cell she can find and stings her "rival" sister queen to death. She becomes sexually mature when she is 6 days old, and she mate on any day that the afternoon temperature is above 65 degrees. Mating is always done in the afternoon and never in the morning. The whole hive becomes involved, flying and foraging are reduced, worker bee stand at the entrance scent fanning to attract the new queen outside, other worker bees literally assault her, push her, and even bite at her legs to "force" the queen outside and becomes airborne on her nuptial flight. Generally the queen mates with several different drones on her first flight which occurs at a drone gathering area 1-3 miles from the colony, and the entire flight rarely lasts more than 30 minutes. Upon returning to the hive, she might rest for a few minutes and then return to the drone area for more

mating, and quitting after she has mated with 10-17 different drones. Now her spermatheca is filled with 4-6 million sperm from numerous drones, enough to last her entire life, and she is expected to lay up to 200,000 eggs per year! She begins laying eggs about 3 days after her last mating. Hence, depending on the weather, from the day a colony swarms until the new queen lays her first egg back in the old hive is about 10 days or more, 12-14 days being average. Many, many researchers and beekeepers have tried to measure the egg production of a queen. Although the figure of 1924 eggs laid in 24 hours is the highest recorded, bee scientists agree that the average queen lays 1000 to 1500 eggs per day during the MOST ACTIVE brood rearing period which is probably April and May in Maryland. The MAXIMUM colony population that is attainable is: Assume the average worker's life span is 40 days and a queen lays 1500 eggs/day yields a total of 60,000 bees. Obviously, this 60,000 is a high ideal figure, and not an average. 40,000 - 50,000 might be the best figure for fine colonies having a young, well bred queen managed by a good beekeeper. Egg laying ability declines with age. Even more important, the queen's ability to produce enough queen pheromone to "glue" a huge population of bees into a single functioning unit without swarming radically declines with age! Hence, the "smart" beekeeper requeens a colony EVERY YEAR regardless of how good that queen was the first season. A real young queen not only can produce a larger quantity of bees who can produce a higher yield of honey, but the beekeeper is not bothered by swarming because a real young queen can produce a great amount of queen pheromone.

WOW! I am worn out just trying to think of all these behavioral things that are so important. It has been difficult for me is to try and present them to you, most of whom do not have a scientific background, in a form and words that you can understand.

I have some hope that you will not think of me as a priest or preacher trying to make each and every one of you perfect and a super beekeeper, because I know that this is impossible. However, I do feel quite strongly that a good understanding of the behavior of bees in various circumstances is the real difference between just having bees as compared to really keeping bees which pays you that extra dividend of discovering the myriad JOYS OF BEEKEEPING.

Have a Fine Holiday and A Happy New Year

George Imirie
Certified Master Beekeeper